AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re Patent Application of

ALVAREZ AREVALO et al

Serial No. 10/549,912

Filed: September 20, 2005

Title: TRANSMITTING OVER A NETWORK

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Atty Dkt. CC-36-1925

C# M#

Confirmation No. 4788

TC/A.U.: 4152

Examiner: Marshall McLeod

Date: February 23, 2009

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

| | | | |
|---|---|---|---|
| ☐ | **NOTICE OF APPEAL** Applicant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner twice/finally rejecting applicant's claim(s). | $540.00 (1401)/$270.00 (2401) | $ |
| ☒ | An appeal **BRIEF** is attached in the pending appeal of the above-identified application | $540.00 (1402)/$270.00 (2402) | $ 540.00 |
| ☐ | Credit for fees paid in prior appeal without decision on merits | | -$ ( ) |
| ☐ | A reply brief is attached. | | **(no fee)** |
| ☐ | Pre-Appeal Brief Request for Review form attached. | | |
| ☐ | Petition is hereby made to extend the current due date so as to cover the filing date of this paper and attachment(s) | One Month Extension $130.00 (1251)/$65.00 (2251)<br>Two Month Extensions $490.00 (1252)/$245.00 (2252)<br>Three Month Extensions $1110.00 (1253/$555.00 (2253)<br>Four Month Extensions $1730.00 (1254/$865.00 (2254) | $ 0.00 |
| | ☐ "Small entity" statement attached. | | |
| | Less month extension previously paid on | | -$( ) |
| | | **TOTAL FEE ENCLOSED** | $ 540.00 |

☒ **CREDIT CARD PAYMENT FORM ATTACHED.**

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension. The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our **Account No. 14-1140.**

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1442067

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
# BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of

ALVAREZ AREVALO et al — Atty. Ref.: 36-1925

Serial No. 10/549,912 — TC/A.U.: 4152

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For: TRANSMITTING OVER A NETWORK

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February 23, 2009

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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## APPEAL BRIEF

Sir:

Appellant hereby appeals to the Board of Patent Appeals and Interferences from the last decision of the Examiner.

## TABLE OF CONTENTS

## (I) REAL PARTY IN INTEREST

The real party in interest is British Telecommunications public limited company, a corporation of the country of the United Kingdom.

## (II) RELATED APPEALS AND INTERFERENCES

The appellant, the undersigned, and the assignee are not aware of any related appeals, interferences, or judicial proceedings (past or present), which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## (III) STATUS OF CLAIMS

Claims 1-10 are pending and have been rejected. No claims have been substantively allowed. All of rejected claims 1-10 are being appealed.

## (IV) STATUS OF AMENDMENTS

A Response requesting reconsideration of the Final Rejection was filed on November 3, 2008. An Advisory Action was issued on December 2, 2008 continuing to reject all claims, but stating that the Response would be entered for purposes of appeal.

## (V) SUMMARY OF CLAIMED SUBJECT MATTER

Each independent claim, each dependent claim argued separately, and each claim having means plus function language is summarized below including exemplary reference(s) to page and line number(s) of the specification.

1. A method of transmitting an encoded sequence over a network to a terminal, comprising

storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression [Fig. 1, ref. 11; page 2, lines 6-19];

transmitting a current one of said versions [Fig. 3, step 102; page 6, lines 9-12];

ascertaining the data rate permitted by the network [Fig. 3, step 105; page 6, line 17];

ascertaining the state of fullness of a receiving buffer at the terminal [Fig. 3, step 106; page 5, lines 10-13; page 6, line 18];

for at least one candidate version, computing in respect of at least one discrete portion thereof as yet unsent the maximum value of current buffer fullness that would be needed to avoid buffer underflow were any number of portions starting with that portion to be sent at the currently ascertained permitted rate [Fig. 3, step 107; page 6, lines 7-26];

comparing the determined maximum needed buffer fullness value(s) with the ascertained current buffer fullness state [Fig. 3, step 108; page 6, lines 22-23];

selecting one of said versions for transmission, in dependence on the results of said comparisons [Fig. 3, step 109; page 6, line 24]; and

transmitting the selected version [Fig. 2, step 102; page 6, lines 25-26].

2. A method of transmitting an encoded sequence over a network to a terminal, comprising

storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression [Fig. 1, ref. 11; page 2, lines 6-19];

for each version and for each of a plurality of nominal transmitting rates, computing in respect of at least one discrete portion thereof the maximum value of current buffer fullness that would be needed to avoid receiving buffer underflow at the terminal were any number of portions starting with that portion to be sent at the respective nominal rate [page 7, line 7 through page 8, line 26];

storing said maximum needed buffer fullness values;

transmitting a current one of said versions [Fig. 3, step 102; page 6, lines 9-12];

ascertaining the data rate permitted by the network [Fig. 3, step 106; page 5, lines 10-13; page 6, line 18];

ascertaining the state of fullness of a receiving buffer at the terminal [Fig. 3, step 106; page 5, lines 10-13; page 6, line 18];

for at least one candidate version, using the ascertained permitted data rate and the stored maximum needed buffer fullness values to estimate a respective maximum needed buffer fullness value corresponding to said ascertained permitted data rate [page 7, line 7 through page 8, line 26];

comparing the estimated maximum needed buffer fullness value(s) with the ascertained buffer state [Fig. 3, step 108; page 6, lines 22-23];

selecting one of said versions for transmission, in dependence on the results of said comparison(s) [Fig. 3, step 109; page 6, line 24]; and

transmitting the selected version [Fig. 2, step 102; page 6, lines 25-26].

7. A storage medium for storing a video recording, comprising

a plurality of encoded versions of the same video sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression [page 7, line 7 through page 8, line 26]; and

for each discrete portion of each version and for each of a plurality of nominal transmitting rates, a maximum value of current buffer fullness for that portion being the maximum of (a) the value needed to avoid buffer underflow that would occur were that

portion to be sent at the respective nominal rate [page 7, line 7 through page 8, line 26]; and

(b) the values needed to avoid buffer underflow that would occur were that portion and any number of subsequent portions subsequent thereto to be sent at the respective nominal rate [page 7, line 7 through page 8, line 26].

8. A storage medium for storing an audio recording comprising

a plurality of encoded versions of the same audio sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression [page 7, line 7 through page 8, line 26]; and

for each discrete portion of each version and for each of a plurality of nominal transmitting rates, a maximum value of current buffer fullness for that portion, being the maximum of (a) the value needed to avoid buffer underflow that would occur were that portion to be sent at the respective nominal rate [page 7, line 7 through page 8, line 26]; and

(b) the values needed to avoid buffer underflow that would occur were that portion and any number of subsequent portions subsequent thereto to be sent at the respective nominal rate [page 7, line 7 through page 8, line 26].

9. An apparatus for transmitting an encoded sequence over a network to a terminal, comprising

a store [Fig. 1, ref. 11; page 2, lines 6-19] storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression [page 2, lines 6-19];

a transmitter [Fig. 1, ref. 12; page 2, lines 27-29]; and

control means [Fig. 1, ref. 13; page 2, lines 29-32] operable to receive data as to the data rate permitted by the network and data as to the state of fullness of a receiving buffer at the terminal and, for at least one candidate version, to compute in respect of at least one discrete portion thereof as yet unsent the maximum value of current buffer fullness that would be needed to avoid buffer underflow were any number of portions starting with that portion to be sent at the permitted rate, to compare the determined maximum needed buffer fullness value(s) with the buffer fullness state and to select one of said versions for transmission, in dependence on the results of said comparisons [page 6, lines 7-26].

10. An apparatus for transmitting an encoded sequence over a network to a terminal, comprising

a store [Fig. 1, ref. 11; page 2, lines 6-19] storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions

of data and each version corresponds to a respective different degree of compression, each version including, for each of a plurality of nominal transmitting rates, in respect of at least one discrete portion thereof, the maximum value of current buffer fullness that would be needed to avoid receiver buffer underflow at the terminal were any number of portions starting with that portion to be sent at the respective nominal rate [page 7, line 7 to page 8, line 26];

a transmitter [Fig. 1, ref. 12]; and

control means [Fig. 1, ref. 13; page 2, lines 29-32] for receiving data as to the data rate permitted by the network and data as to the state of fullness of a receiving buffer at the terminal and, for at least one candidate version, to use the permitted data rate and the stored maximum needed buffer fullness values to estimate a respective maximum needed buffer fullness value corresponding to said permitted data rate, to compare the estimated maximum needed buffer fullness value(s) with the buffer fullness state and to select one of said versions for transmission, in dependence on the results of said comparisons [page 7, line 7 to page 8, line 26].

## (VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-10 have been finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Aharoni et al. ("Aharoni") in view of Zhu et al. ("Zhu").

## (VII) ARGUMENT

**Claims 1-10 have been finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Aharoni et al. ("Aharoni") in view of Zhu et al. ("Zhu").**

The Examiner admits that Aharoni does not teach or suggest certain elements of, for example, claim 1. *See* Final Office Action at pages 3-4. However the Examiner has failed to appreciate that Zhu also fails to teach or suggest these claim elements. Moreover, those skilled in the art would not have been led to combine Zhu with Aharoni in the way the Examiner alleges and even if, assuming *arguendo*, they did so Appellant's invention would not have resulted.

Zhu discloses ascertaining the state of fullness of a receiving buffer at a terminal. *See* Zhu at column 3, lines 3-26. However, similarly to Aharoni, Zhu does not disclose or suggest (i) "for at least one candidate version, computing in respect of at least one discrete portion as yet unsent the maximum value of buffer fullness that would be needed to avoid buffer overflow were any number of portions starting with that portion to be sent at the currently ascertained permitted rate," or (ii) "comparing the determined maximum needed buffer fullness value(s) with the current buffer fullness state," as required by claim 1.

Taking (ii) first, Zhu discloses:

> Then in order for the decoder buffer not to overflow, the following inequality has to be satisfied:
>
> $B_{n-1} + \int_{t_{n-1}}^{t_{n+1}} R(t)dt - E_n < S$ where $S$ is the buffer size, and

$R_{n-1,n+1} = \int_{t_{n-1}}^{t_{n+1}} R(t)dt$ is the number of output bits from time $t_{n-1}$ to $t_{n+1}$ sent to the channel.

*See* Zhu at column 5, lines 1-18. This inequality is a buffer fullness limit but is not the claimed "maximum value of current buffer fullness that would be needed to avoid buffer underflow." *Compare* claim 1. More particularly, it is a limit that, in order to avoid overflow, must not be reached. This highlights a difference between Zhu and Appellant's invention which is that Appellant's invention is aiming to avoid underflow, whereas Zhu is trying to avoid overflow. To be sure, Zhu mentions in column 3, lines 8-11 that overflow or underflow may occur if steps are not taken to prevent them, but then goes on to observe at column 3, lines 26-30 that underflow is rare and not a severe problem, and in fact does not propose any steps to prevent underflow. So the most that Zhu may be said to teach in relation to underflow is that it can occur if no countermeasures are taken to prevent it; Zhu is silent on which countermeasures one might use.

Turning to (i), Zhu's inequality for preventing buffer overflow, i.e., quantity $\int_{t_{n-1}}^{t_{n+1}} R(t)dt$ given above, also does not meet the claim 1 limitation of "computing in respect of at least one discrete portion as yet unsent . . . [a] value of current buffer fullness that would be needed to avoid [a undesirable condition]." Zhu fails to teach this limitation because (leaving aside that the quantity is not explicitly calculated) this quantity is not one that is needed but actually one that is to be avoided. Furthermore, it is certainly not the case that Zhu does this "for at least one candidate version" – as required by claim 1

– since of course in Zhu's case there is only one version altogether. Additionally, Zhu does <u>not</u> perform the computing of "the maximum value of buffer fullness were any number of portions to be sent at the currently ascertained rate" – i.e., considering the possibility of different numbers of portions and taking the largest of the buffer fullnesses that this gives. Zhu just derives one value, for the interval of t-1 to t+1. *See*, *inter alia*, Zhu at column 5, lines 8-12.

In the advisory action, the Examiner disputes that Zhu just derives one value for the interval of t-1 and t+1 and alleges that Zhu "gives several formulas for computing the maximum buffer fullness" – citing Zhu at column 5, lines 1-41. *See* Advisory Action dated December 2, 2008 at page 3. The cited portion of Zhu merely provides an alternative inequality for preventing buffer overflow that must be maintained when the bit-rate channel is not adjustable which has nothing to do with teaching the above described limitations of present claim 1.

Accordingly, Zhu fails to provide several of the claimed integers that are missing from Aharoni.

Moreover, combining the teachings of Aharoni and Zhu would not result in the claimed invention. Aharoni is concerned with video streaming and in particular in choosing among different versions so as to suit the prevailing channel capacity. The whole purpose of Zhu, on the other hand, is to compensate for jitter, monitoring for probable overflow and applying bit stuffing if overflow is expected. Thus, the natural way to combine the teaching of Aharoni and Zhu would be to use Aharoni's method of stream selection and then use Zhu's method of correcting for jitter, applying bit stuffing if overflow is feared. This would not, of course, result in the invention as claimed. There

is no reason why the skilled person wanting to improve Aharoni's method of version selection would see Zhu as relevant to the issue.

The advantage of the invention over Aharoni is that it provides a way of looking ahead and avoiding underflow problems that may arise some time later on in the streaming; there is nothing in Zhu which could be perceived as of help in addressing this issue, as Zhu's described mechanism is all about jitter, not stream selection, is dealing with overflow, and in any case does not look ahead beyond t+1.

Of the other independent claims, claim 9 is an apparatus claim equivalent to claim 1 and the same arguments apply. Accordingly, claims 1 and 9 dependent claims 4-6 patentably define over the cited art taken singly or in combination.

The inventions of independent claims 2, 7, 8 and 10 differ from claim 1 in that instead of performing the whole computation for the particular current permitted data rate, these claims calculate the buffer fullness values in advance "for each of a plurality of nominal transmitting rates" and use these to estimate the value for the actual rate once this has been ascertained, thereby reducing the amount of processing that has to be performed in real time. Support for this alternative embodiment can be found in the present specification at page 7, line 7 to page 8, line 26. In rejecting these claims the Examiner has not cited to any other portions of Zhu as disclosing this alternative embodiment. The Examiner's previously cited portions of Zhu do not make any mention of using "nominal transmitting rates" and clearly do not teach or suggest these claims. Accordingly, independent claims 2, 7, 8 and 10 also patentably define over the cited art taken singly or in combination.

## CONCLUSION

In conclusion it is believed that the application is in clear condition for allowance; therefore, early reversal of the Final Rejection and passage of the subject application to issue are earnestly solicited.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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## (VIII) CLAIMS APPENDIX

1. A method of transmitting an encoded sequence over a network to a terminal, comprising

storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression;

transmitting a current one of said versions;

ascertaining the data rate permitted by the network;

ascertaining the state of fullness of a receiving buffer at the terminal;

for at least one candidate version, computing in respect of at least one discrete portion thereof as yet unsent the maximum value of current buffer fullness that would be needed to avoid buffer underflow were any number of portions starting with that portion to be sent at the currently ascertained permitted rate;

comparing the determined maximum needed buffer fullness value(s) with the ascertained current buffer fullness state;

selecting one of said versions for transmission, in dependence on the results of said comparisons; and

transmitting the selected version.

2. A method of transmitting an encoded sequence over a network to a terminal, comprising

storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression;

for each version and for each of a plurality of nominal transmitting rates, computing in respect of at least one discrete portion thereof the maximum value of current buffer fullness that would be needed to avoid receiving buffer underflow at the terminal were any number of portions starting with that portion to be sent at the respective nominal rate;

storing said maximum needed buffer fullness values;

transmitting a current one of said versions;

ascertaining the data rate permitted by the network;

ascertaining the state of fullness of a receiving buffer at the terminal;

for at least one candidate version, using the ascertained permitted data rate and the stored maximum needed buffer fullness values to estimate a respective maximum needed buffer fullness value corresponding to said ascertained permitted data rate;

comparing the estimated maximum needed buffer fullness value(s) with the ascertained buffer state;

selecting one of said versions for transmission, in dependence on the results of said comparison(s); and

transmitting the selected version.

3. A method according to claim 1 in which said maximum needed buffer fullness determination is performed only for selected ones of said portions at which a version change is to be permitted.

4. A method according to claim 1 in which each computed needed buffer fullness value is the difference between (a) the time needed to transmit, at the relevant rate, the portion in question and zero or more consecutive subsequent portions up to and including any particular portion, and (b) the difference between the playing instant of the respective particular portion and the playing instant of the portion preceding the portion in question.

5. A method according to claim 1 in which the sequence is a video sequence.

6. A method according to claim 1 in which the sequence is an audio sequence.

7. A storage medium for storing a video recording, comprising

a plurality of encoded versions of the same video sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression; and

for each discrete portion of each version and for each of a plurality of nominal transmitting rates, a maximum value of current buffer fullness for that portion being the maximum of (a) the value needed to avoid buffer underflow that would occur were that portion to be sent at the respective nominal rate; and

(b) the values needed to avoid buffer underflow that would occur were that portion and any number of subsequent portions subsequent thereto to be sent at the respective nominal rate.

8. A storage medium for storing an audio recording comprising

a plurality of encoded versions of the same audio sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression; and

for each discrete portion of each version and for each of a plurality of nominal transmitting rates, a maximum value of current buffer fullness for that portion, being the maximum of (a) the value needed to avoid buffer underflow that would occur were that portion to be sent at the respective nominal rate; and

(b) the values needed to avoid buffer underflow that would occur were that portion and any number of subsequent portions subsequent thereto to be sent at the respective nominal rate.

9. An apparatus for transmitting an encoded sequence over a network to a terminal, comprising

a store storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression;

a transmitter; and

control means operable to receive data as to the data rate permitted by the network and data as to the state of fullness of a receiving buffer at the terminal and, for at least one candidate version, to compute in respect of at least one discrete portion thereof as yet unsent the maximum value of current buffer fullness that would be needed to avoid buffer underflow were any number of portions starting with that portion to be sent at the permitted rate, to compare the determined maximum needed buffer fullness value(s) with the buffer fullness state and to select one of said versions for transmission, in dependence on the results of said comparisons.

10. An apparatus for transmitting an encoded sequence over a network to a terminal, comprising

a store storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression, each version including, for each of a plurality of nominal transmitting rates, in respect of at least one discrete

portion thereof, the maximum value of current buffer fullness that would be needed to avoid receiver buffer underflow at the terminal were any number of portions starting with that portion to be sent at the respective nominal rate;

a transmitter; and

control means for receiving data as to the data rate permitted by the network and data as to the state of fullness of a receiving buffer at the terminal and, for at least one candidate version, to use the permitted data rate and the stored maximum needed buffer fullness values to estimate a respective maximum needed buffer fullness value corresponding to said permitted data rate, to compare the estimated maximum needed buffer fullness value(s) with the buffer fullness state and to select one of said versions for transmission, in dependence on the results of said comparisons.

## (IX) EVIDENCE APPENDIX

None.

## (X) RELATED PROCEEDINGS APPENDIX

None.